

IN THE CLAIMS

Please replace all prior versions, and listings, of claims in the application with the following list of claims. Additions are indicated by underlining and deletions are indicated by strikeouts.

1. (Currently Amended) An apparatus, comprising:
a ~~chip~~ device comprising a predetermined reaction site having a volume of less than about 1 ml; and
an active control system able to control an environmental factor associated with the ~~chip~~ device in response to a signal indicative of a condition associated with the ~~chip~~ device, so as to support a living cell within the predetermined reaction site.
2. (Currently Amended) The apparatus of claim 1, the ~~chip~~ device comprising a plurality of reactors, wherein one of the plurality of reactors comprises the predetermined reaction site.
3. (Currently Amended) The apparatus of claim 1, wherein the active control system is integrally connected to the ~~chip~~ device.
4. (Original) The apparatus of claim 1, wherein the predetermined reaction site has a volume of less than about 500 microliters.
5. (Original) The apparatus of claim 1, wherein the predetermined reaction site has a volume of less than about 100 microliters.
6. (Original) The apparatus of claim 1, wherein the predetermined reaction site has a volume of less than about 10 microliters.
7. (Original) The apparatus of claim 1, wherein the predetermined reaction site has a volume of less than about 1 microliter.

8. (Original) The apparatus of claim 1, wherein the predetermined reaction site has a maximum dimension of less than about 1 cm.
9. (Original) The apparatus of claim 1, wherein the predetermined reaction site has a maximum dimension of less than about 1 mm.
- 10-14. (Cancelled)
15. (Original) The apparatus of claim 1, wherein the living cell is a mammalian cell.
16. (Original) The apparatus of claim 1, wherein the living cell is a bacterium.
17. (Original) The apparatus of claim 1, wherein the cell is a plant cell.
18. (Original) The apparatus of claim 1, wherein the living cell is part of a tissue culture.
19. (Original) The apparatus of claim 1, wherein at least one surface of the predetermined reaction site comprises a polymer.
20. (Original) The apparatus of claim 19, wherein the at least one surface consists essentially of the polymer.
21. (Currently Amended) The apparatus of claim 19, wherein the polymer is selected from the group consisting of a silicone, a polycarbonate, a polyethylene, a polypropylene, a polytetrafluoroethylene, a polyvinylidene chloride, a bis-benzocyclobutene, a polystyrene, a polyacrylate, a polymethacrylate, a polyimide, and combinations and copolymers thereof.

22. (Currently Amended) The apparatus of claim 1, wherein the control system is able to control at least one environmental factor within the predetermined reaction site selected from the group consisting of:

relative humidity,	pH,
molarity,	a concentration of a dissolved gas,
osmolarity,	glucose concentration,
glutamine concentration,	pyruvate concentration,
apatite concentration,	color,
turbidity,	viscosity,
a concentration of an amino acid,	a concentration of a vitamin,
a concentration of a hormone,	serum concentration,
a concentration of an ion,	shear rate,
degree of agitation,	temperature,
pressure,	O ₂ concentration,
CO ₂ concentration,	
and a concentration of an oligopeptide.	

23. (Original) The apparatus of claim 1, wherein the control system is able to control the temperature within the predetermined reaction site.

24. (Cancelled)

25. (Currently Amended) An apparatus, comprising:

a ~~chip~~ device comprising a predetermined reaction site having a volume of less than about 1 ml; and

a control system able to control an environmental factor associated with the predetermined reaction site, the environmental factor being at least one of relative humidity, pH, dissolved O₂ concentration, dissolved CO₂ concentration, and concentration of a media component.

26. (Currently Amended) The apparatus of claim 25, wherein the control system is integrally connected to the ~~chip~~ device.

27. (Currently Amended) The apparatus of claim 25, wherein the ~~chip~~ device is constructed and arranged to maintain at least one living cell at the predetermined reaction site.
28. (Currently Amended) The apparatus of claim 25, wherein the media component is selected from the group consisting of a carbohydrate source, serum, a growth factor, an enzyme, a hormone, an amino acid, a lipid, or an oligopeptide.
29. (Original) The apparatus of claim 25, wherein the carbohydrate source is glucose.
30. (Currently Amended) The apparatus of claim 25, the ~~chip~~ device comprising a plurality of reactors, wherein one of the plurality of reactors comprises the predetermined reaction site.
31. (Original) The apparatus of claim 25, wherein the predetermined reaction site has a volume of less than about 500 microliters.
32. (Cancelled)
32. (Cancelled)
33. (Original) The apparatus of claim 25, wherein the living cell is a mammalian cell.
34. (Currently Amended) An apparatus, comprising:
a ~~chip~~ device comprising a predetermined reaction site having a volume of less than about 1 ml; and
a sensor integrally connected to the ~~chip~~ device, wherein the sensor is able to determine an environmental factor associated with the predetermined reaction site, the environmental factor being at least one of:
pH, a concentration of a dissolved gas,
molarity, osmolarity,
glucose concentration, glutamine concentration,

pyruvate concentration, color, viscosity; a concentration of a vitamin; serum concentration; shear rate;	apatite concentration, turbidity, a concentration of an amino acid, <u>and</u> a concentration of a hormone; a concentration of an ion; and degree of agitation; and
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~~an actuator integrally connected to the chip able to alter the environmental factor.~~

35. (Currently Amended) The apparatus of claim 34, wherein the ~~chip~~ device is constructed and arranged to maintain at least one living cell at the predetermined reaction site.

36-40. (Cancelled)

41. (Currently Amended) The apparatus of claim 40, ~~wherein the~~ further comprising a processor is integrally connected to the article, the processor able to determine a response based on a measurement from the sensor.

42. (Currently Amended) The apparatus of claim 40 ~~41~~, wherein the processor comprises an electronic circuit.

43. (Currently Amended) The apparatus of claim 34, the ~~chip~~ device comprising a plurality of reactors, wherein one of the plurality of reactors comprises the predetermined reaction site

44. (Original) The apparatus of claim 34, wherein the predetermined reaction site has a volume of less than about 500 microliters.

45. (Cancelled)

46. (Original) The apparatus of claim 34, wherein at least one surface of the predetermined reaction site comprises a polymer.

47. (Original) The apparatus of claim 34, wherein the living cell is a mammalian cell.
48. (Currently Amended) The apparatus of claim 34, further comprising a processor able to receive a signal from the sensor and produce a signal to the actuator.
49. (Currently Amended) An apparatus, comprising:
a ~~chip~~ device comprising a predetermined reaction site having a volume of less than about 1 ml;
a first sensor integrally connected to the ~~chip~~ device, the first sensor able to determine at least one of temperature and pressure; and
a second sensor integrally connected to the ~~chip~~ device, wherein the second sensor is able to determine a second environmental factor, the second environmental factor being at least one of:
pH,
molarity,
glucose concentration,
pyruvate concentration,
color,
~~viscosity,~~
~~a concentration of a vitamin,~~
~~serum concentration,~~
~~shear rate,~~
a concentration of a dissolved gas,
osmolarity,
glutamine concentration,
apatite concentration,
turbidity,
a concentration of an amino acid, and
~~a concentration of a hormone,~~
a concentration of an ion;
~~and degree of agitation; and~~
~~an actuator integrally connected to the chip able to alter at least one of the temperature, the pressure, and the environmental factor.~~
50. (Currently Amended) The apparatus of claim 49, wherein the ~~chip~~ device is constructed and arranged to maintain at least one living cell at the predetermined reaction site.
- 51-52. (Cancelled)
53. (Currently Amended) The apparatus of claim ~~51~~ 34, further comprising a temperature sensor.

54-72. (Cancelled)

73. (Currently Amended) An apparatus, comprising:

a ~~chip~~ device comprising a predetermined reaction site having a volume of less than about 1 ml; and

an active control system able to control an environment within the predetermined reaction site so as to support a living cell for a period of at least 1 day.

74. (Currently Amended) The apparatus of claim 73, wherein the control system is integrally connected to the ~~chip~~ device.

75. (Currently Amended) The apparatus of claim 73, wherein the ~~chip~~ device is constructed and arranged to maintain at least one living cell at the predetermined reaction site.

76. (New) The apparatus of claim 1, wherein the living cell is an insect cell.

77. (New) The apparatus of claim 19, wherein the polymer is a copolymer.

78. (New) The apparatus of claim 25, wherein at least one surface of the predetermined reaction site comprises a polymer.

79. (New) The apparatus of claim 32, wherein the polymer is a copolymer.

80. (New) The apparatus of claim 25, wherein the living cell is an insect cell.

81. (New) The apparatus of claim 46, wherein the polymer is a copolymer.

82. (New) The apparatus of claim 34, wherein the living cell is an insect cell.